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## **Pygmalion Grows Up: A Model for Teacher Expectation Communication and Performance Influence**

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*Much research has examined the effects teacher expectations have on student performance. While evidence indicating that expectations bias student performance is scant, a substantial literature suggests expectations can sustain performance at undesirable levels. Classroom observation reveals consistent patterns of differential teacher behavior toward high- and low-expectation students. No model has yet emerged, however, which integrates particular treatment findings into an influence sequence. Such a model is presented, outlining the cognitive processes through which teacher expectations can sustain a given level of achievement. The model suggests that teachers frequently give affectively valanced feedback to low-expectation students as a mechanism for interaction control. High-expectation students more frequently receive feedback based on their effort expenditure. These different evaluation contingencies may lead lows to believe less strongly than highs that effort will influence academic outcomes. Differences in effort-outcome covariation perceptions may lead to less persistence and more failure on the part of lows than highs, thus sustaining poorer performance. Possible means for identifying Pygmalion-prone teachers and research needed to validate the model are discussed.*

The research for determinants of academic performance has taken many directions, has consumed much time and effort, and continues to generate public concern. The results of this search indicate that academic achievement is the outcome of relations at various levels of analysis. These relations encompass intrapersonal, interpersonal, and environmental factors. One example of an interpersonal influence on achievement is the role that teacher expectations play in determining student performance. Teacher expectations, as a social psychological phenomenon, will be the topic of present concern.

Early studies of expectation effects (i.e., Rosenthal & Jacobson, 1968) generated considerable controversy. This was due mainly to differences in educators' beliefs concerning the inferential power of isolated studies and to methodological problems associated with *in vivo* educational research. The history of expectation research, however, is now a decade old. Most issues involving expectation effects have been addressed in multiple studies, often employing different methods. Thus, a first purpose of this article is to update previous reviews of research on expectation effects.

Although influences on student performance are multiple and complex, a synthesis of information leads to the conclusion that teacher expectations often do play a role

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in student achievement. Given this assessment, two related questions become salient: (1) How are teacher expectations communicated? (2) How do they influence student performance? Another purpose of this paper is to present a causal model which attempts to answer these questions. The model is primarily an induction from past educational and social psychological findings, some with and some without expectation effects as their original concern. Pursuit of the twin purposes, then, begins with a brief history of interpersonal expectation research.

## A Review of Expectation Research

*Expectations as an independent variable.* Rosenthal and Fode (1963) first demonstrated the impact of interpersonal expectations in a social setting. In their experiment, 10 advanced undergraduate and graduate students served as experimenters. Their task involved presenting a series of photographs of human faces and asking subjects to rate the degree of success or failure present. All experimenters were given identical instructions to read and all were told that the study involved replicating well-established results. However, half were told that the photographs would be rated successful while the other half were led to expect unsuccessful ratings. Results showed that experimenters expecting successful ratings obtained more successful ratings than experimenters expecting failure.

The impact of interpersonal expectations was soon evaluated in other research settings. Studies involving reaction times, inkblot test responses, psychophysical judgements, and animal learning, among others, were carried out (Rosenthal, 1969). In each case the existence of expectation effects was documented. Researchers were not content, however, to restrict the study of expectation effects to the laboratory nor to the study of experimental artifacts. Indeed, the area which has received the most public and scientific attention has been the influence of performance expectations on school achievement.

Active interest in teacher performance expectations was stimulated by the claims of Clark (1963). Clark argued that some ghetto children might be the victims of low teacher expectations which became self-fulfilling prophecies. The fact that ghetto teachers believed their students could not learn was quickly verified (Harlem Youth Opportunities Unlimited, 1964). Empirical support of Clark's assertion that this expectation could become a self-fulfilling prophecy also was forthcoming. The most widely cited, and controversial, of supporting studies was Rosenthal and Jacobson's.

## Pygmalion in the Classroom (1968)

The *Pygmalion* study involved an experimental manipulation of teacher expectations and an assessment of its effects upon student IQ scores. Twenty percent of the students in 18 classrooms were described to teachers as having shown remarkable potential for academic growth. Intellectual potential had supposedly been assessed through written examination. In actuality, these students had been chosen at random; the examination was a test of nonverbal intelligence. Readministration of the test 8 months later revealed differences in intellectual growth between "bloomers" and other students. Students in early grades for whom high teacher expectation had been induced showed significant gains in total IQ and reasoning IQ when compared to other students in their school.

The *Pygmalion* findings did not gain immediate public or scientific acceptance. In

fact, the *Pygmalion* study was strongly criticized on methodological grounds (Elashoff & Snow, 1971; Jensen, 1969; Thorndike, 1968), though these criticisms did not go unanswered (Rosenthal & Rubin, 1971). Fortunately, the passage of time has produced numerous expectancy studies. Some conclusions concerning their effects can now be drawn with greater confidence.

Rosenthal (1976) presented a comprehensive meta-analysis (Glass, 1976) of studies which assessed expectation effects. Over 300 studies were examined; of these 37% report significant ( $p < .05$ ) results in a direction confirming an expectancy influence on subject behavior. Such a percentage is nearly impossible to obtain given that chance is operating. When the sample is restricted to classroom and nonlaboratory situations (most involving teacher-learner relations), the percentage of studies supporting effects is nearly identical to the overall percentage (38%). Three hundred forty teachers had participated in studies where individual teacher data were reported. Of these teachers, 70% showed means in a direction confirming expectation influence.

Within teacher-learner studies, a variety of subject populations and dependent variables have been employed. In addition to traditional classroom populations, Rosenthal (1974) cited research using as subjects disadvantaged boys and girls, United States Air Force Academy cadets, and Manpower Development trainees, to name a few. The impact of expectations has been measured on outcomes as varied as swimming ability, job performance, and absenteeism. This variety of measures speaks favorably to the convergent validity of the expectation concept. That is, the evidence indicates that expectation effects are not tied to specific instruments used to measure them.

Distinct methodologies have also been employed for the induction or measurement of the expectation variable. For example, an experiment by Meichenbaum, Bowers, and Ross (1969) was similar to the original *Pygmalion* study but had modifications addressing some of that study's flaws. Fourteen female adolescent offenders were subjects. The experiment took place in a training school where the girls had four teachers. All teachers took part and were first asked to evaluate the girls' academic potential. The experimenters then chose three girls who had received uniformly low expectations and three who received uniformly high expectations. These girls were described to teachers as "late bloomers," based on test scores. After showing initial surprise concerning selection of the low-expectation girls, the experimenters stated that teachers went through a group process of "justifying" the late-bloomer information. Classrooms were observed and achievement tests were readministered some 9 weeks later. Results showed "late-blooming" girls significantly improved their performance on objectively graded tests in comparison to controls. No differences were found in subjective areas (e.g. essays), and no interaction with prior expectations occurred.

More recently, quasi-experimental designs have been employed to assess the impact of expectations. These designs have the advantage of using teacher-supplied expectations as predictors, thus ensuring their plausibility and external validity. (There are disadvantages to these designs as well, to be discussed shortly.) In one such effort, Crano and Mellon (1978) used a cross-lagged panel analysis. Teacher expectations were gathered for 4,300 British elementary school children. Expectations were both social and academic; achievement was measured with standardized tests. Crano and Mellon report that teacher expectations caused "children's achievements

to an extent appreciably exceeding that to which children's performance impinged on teacher attitudes" (p. 39). This pattern was especially true of the social expectations, though it held for academic ones as well.

McDonald and Elias (1976) employed another quasi-experimental technique. At the beginning of the school year, they identified students with similar achievement scores but for whom teachers had expressed disparate expectations. When achievement tests were later readministered, differences were found: High expectation students performed better than lows. In a similar effort, Sutherland and Goldschmid (1974) found early teacher expectations were positively related to residualized IQ change over a school year.

*Limitations on expectation findings.* In sum, the existence of expectation effects seems well-established. It is equally clear, however, that expectation effects do not occur invariantly. As Brophy and Good (1974) pointed out, expectation effects in classrooms seem to depend on style differences among teachers. Thinking concerning Pygmalion, then, ought to include criteria for identifying expectation-effect-prone teachers. This issue is returned to below.

A second limitation on expectation findings is that much of the supportive evidence comes from nonmanipulative studies. The Crano and Mellon (1978) and McDonald and Elias (1976) studies are cases in point. In separate reviews of the literature, Brophy and Good (1974) and Dusek (1975) distinguished between studies which involved experimentally induced and naturally measured expectations. Both reviews conclude that evidence showing that manipulated expectations bias student learning exists, but is scant. Each found, however, that teacher-formed expectations relate to student achievement (e.g. Dusek & O'Connell, 1973; O'Connell, Dusek, & Wheeler, 1974). Thus, whether inaccurate teacher expectations can substantially alter student performance is questionable. This may not be plausible because expectations inappropriate enough to bring about severe biasing cannot be maintained in real-life situations (excellent treatments regarding the information teachers *do* use in formulating expectations are available elsewhere; e.g., Braun, 1976; or Rist, 1970). The literature does suggest, however, that naturally formed, relatively accurate expectations can serve to *sustain* the pre-existing achievement variations among students. Further, it is probable that expectations play a role in the translation of student differences in potential into differences in actual achievement. This may lead to heightened *contrasts* in achievement between students. For now, then, it seems best to conclude that expectations influence performance, but they likely *sustain* it at a pre-existing level or allow latent differences in student performance to emerge rather than radically alter its course.

The nonmanipulative nature of supportive evidence also introduces the problem of causal direction. West and Anderson (1976) have argued that, until their writing, evidence was just as supportive of the notion that student achievement causes expectations as it was of expectations causing achievement. Using the mentioned quasi-experiments as examples, recent research supports the possibility that both conclusions may be correct. A cyclical process of mutual influence seems most supportable by the literature. The concern expressed by West and Anderson, however, highlights the causal ambiguity naturalistic results often face.

The conclusion adopted here, then, is that teacher expectations often serve to sustain, rather than bias, student performance. This conclusion acknowledges the probable validity of the discussed limiting conditions. That is, the use of the word

sustaining is meant to connote (1) that the causal relation between expectations and achievement is nonrecursive, and (2) that severe biasing is not a necessary outcome of the expectation process. It should be noted that the acceptance of a sustaining, as opposed to altering, performance role for expectations hardly diminishes the significance of the phenomenon. Even the *maintenance* of below-average performance through teacher-expectation effects ought to be the focus of societal concern. Also, increases in the contrast in student performance, which may be created by expectations leading teachers to focus attention on high-potential students, should be the subject of attention. And, finally, when *both* student performance and teacher expectations are influenced by factors other than intellectual ability (e.g. family apathy), the problem takes on even more significant dimensions.

### Expectations and Classroom Behavior

The research summarized so far illustrates that expectation effects may be found in classrooms. However, a clear understanding of *Pygmalion* cannot be obtained from the above efforts alone. This sense of understanding will follow research and theory that responds to two mediating questions. First, how may performance expectations be communicated in the classroom? Second, how can these communications influence the students' performance? Much research has been conducted in differential treatment of students based on different expectations. Thus, we have a fair idea about some answers to the first question. No model has yet emerged, however, outlining how these differences eventuate in differential or sustained levels of performance (Brophy & Good [1974] did propose the sequence). The second purpose here is the presentation of such a causal model. The model encompasses expectation communication and influence on behavior. It is based on some previous findings linking teacher expectations and behavior. Because expectations influence certain classroom activities, and because these are part of the model, it is important to briefly review some existing communication research.

*The 4-factor categorization.* Rosenthal (1974) provided a useful typology for summarizing behaviors found associated with teacher expectations. The typology contains four factors: climate, input, output, and feedback. Each factor and some representative research will be presented.

First, teachers appear to create a warmer *socioemotional atmosphere* for brighter students. To investigate this possibility, Chaikin, Sigler, and Derlega (1974) videotaped simulated tutorial sessions in order to study nonverbal expectation differences. It was found that teachers who believed they were interacting with bright students smiled and nodded their heads more often than teachers interacting with slow students. Teachers also leaned towards brights and looked brights in the eyes more frequently. Page (1971) as well found high expectations led to more smiling. In addition, Page reported that the largest performance difference appeared between the high-expectation group that received the most smiles and the low-expectation group that received the least smiles. As a final piece of evidence, Kester and Letchworth (1972) induced expectations in professional teachers and observed actual classrooms. They reported that classroom observers found teachers most supportive and friendly toward bright students. It seems, then, that many nonverbal behaviors associated with positive emotional attraction are displayed by teachers most frequently in interactions with students believed to be bright.

There is also evidence indicating that teachers' *verbal inputs* to students are dependent on performance expectations. Students labeled as slow have been found to receive fewer opportunities to learn new material than students labeled bright (Beez, 1970; Brown, Note 1; Carter, Note 2). Slow students also have less difficult material taught to them (Cornbleth, Davis, & Button, 1974; Jeter & Davis, 1973, as reported in Jeter, 1975; Mendoza, Good, & Brophy, Note 3). Thus, the quantity and quality of teacher attempts at novel instruction seem associated with expectations.

The third factor, *verbal output*, can be operationally defined as the frequency with which academic interactions take place and the teacher's persistence in pursuing interactions to a satisfactory conclusion. From the student's perspective, outcome means the number of times the student and teacher are engaged in academic interaction and the length of time the teacher is willing to spend on a given contact. With regard to the latter variable, observation indicates that teachers tend to stay with highs longer after they have failed to answer a question. This persistence following failure takes the form of more clue giving, more repetition, and/or more rephrasing when highs answer a question incorrectly than when lows answer incorrectly (Brophy & Good, 1970b). Teachers have also been found to pay closer attention to responses of students described as gifted (Rothbart, Dalfen, & Barrett, 1971). Finally, Rowe (1974) found that teachers allowed bright students longer to respond before redirecting unanswered questions to other class members.

Among the best researched behavioral correlates of performance expectations is the absolute *frequency of interaction*. Brophy and Good (1974) cited 20 studies (primarily naturalistic observations) in which the frequency of teacher-student academic interactions was assessed. Of these studies, 13 report that teachers more often engage in academic contacts with high- than with low-expectation students. The remaining seven studies report no total frequency differences. This finding is even more dramatic when the interaction initiator is taken into account. Of the seven studies finding no differences in total interaction frequency, two report differences when total contacts are broken down into student- and teacher-initiated contacts (Brophy & Good, 1970b; Evertson, Brophy, & Good, Note 4). Strongly supported by these 20 studies, then, is the finding that high-expectation students will seek more academic contact with the teacher than low-expectation students. What does vary is whether teachers equalize or accentuate this difference through their own initiation. A substantial number of studies can be found reporting that teachers initiate more contacts with highs (Good, 1970; Kester & Letchworth, 1972), or more interactions with lows (Evertson et al., Note 4), or show no initiation differences at all (Brophy & Good, 1970b; Claiborn, 1969). It seems, then, that while expectations often influence teacher initiation of contacts, the direction this influence takes follows no general pattern. Rather, the teacher-contact initiative may be a function of teaching strategy differences. The possibility that these differences may be related to expectation communication is suggested below.

Evidence since the Brophy and Good (1974) writing is consistent with these conclusions. For instance, Firestone and Brody (1975) observed kindergarten classrooms and counted the number of times students gave demonstrations at the board. It was found that the number of student presentations was positively related to IQ scores. Sayavedra (1977) observed 20 physical science classrooms in five different high schools. He reported that high-expectation students received significantly more

teacher-pupil contacts. Two other recent dissertations took initiators into account when classrooms were observed. Bagley (1975) found that teachers initiated more contacts with lows, while Given (1974) reported that highs both sought and were the recipients of more initiations.

To summarize the output factor, teachers often show more willingness to pursue an answer with highs than with lows. Furthermore, highs seem to create more output opportunities for themselves, while teachers vary in whether they equalize or accentuate contact frequency differences.

The final factor, *feedback*, involves the teachers' use of praise and criticism after an academic exchange. As with student initiations, Brophy and Good (1974) found a fairly consistent pattern of teacher use of reinforcement. Teachers tend to praise high-expectation students more and proportionately more per correct response, while lows are criticized more and proportionately more per incorrect response. This result is based on some studies which simply count positive and negative use of affect and some which, allowing for the greater opportunity available to be positive toward highs, adjust praise and criticism use by the number of correct and incorrect responses. The conclusion seems to hold whether the methodology employed uses induced (e.g. Meichenbaum et al., 1969; Medinnus & Unruh, Note 5) or naturally occurring (e.g. Brophy & Good, 1970b; Dalton, 1969) expectations, as long as professional teachers are subjects. Evidence since Brophy and Good (1974) remains consistent with this conclusion (e.g. Cooper & Baron, 1977; Firestone & Brody, 1975). However, when nonprofessional teachers are subjects in classroom simulations, a variety of reinforcement patterns emerge (e.g. Rubovitz & Maehr, 1971; Smith & Luginbuhl, 1976). The fact that lows tend to receive more criticism and less praise from professional teachers plays a central role in the expectation communication model described below.

For each of the four factors, enough evidence exists to conclude that the phenomenon is real. As with the outcome studies cited earlier, however, the appearance of these process differences in specific instances cannot be assumed. For example, Claiborn (1969) found no differences in teacher warmth dependent on expectations, and Jones (1972) found no differences in teacher persistence in seeking responses. Again, it is apparent that teacher variation in expectation influence exists and explanations need to address these differences.

### From Different Treatment to Different Performance

For certain behavioral differences outlined above, the relation to performance seems fairly straightforward. Thus, students who are taught less difficult material and who are presented with less novel instruction should eventually show corresponding weak performance. Yet, this kind of expectation communication does not violate our sensibilities, at least not when the expectation is fairly veridical. While these are genuine expectation phenomena, presenting low-ability students with material as difficult as that offered to highs would undoubtedly create more problems than it would solve. Also, pacing the introduction of new material at equal rates for highs and lows would seem similarly undesirable.

For other treatment differences, specifically the reported greater teacher persistence when interacting with highs, the relation to performance seems clear. A student given less time to respond will less often answer correctly. It is the act's desirability that is



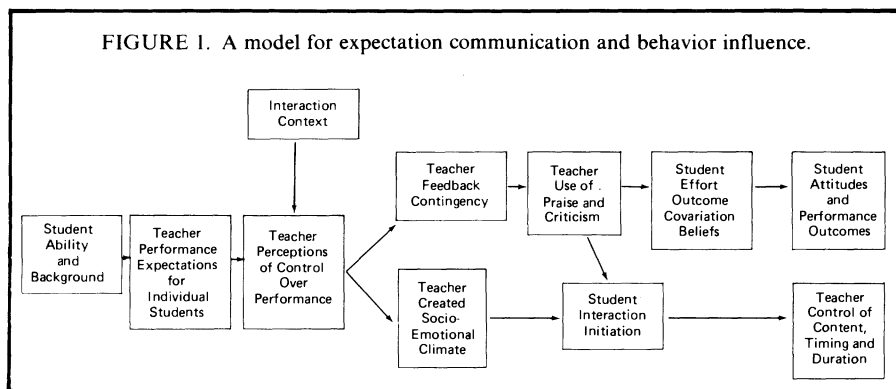
uncertain. Is it fair that prior successes should have this influence on a teacher's future question-asking behavior? Persistence differences may insulate teacher perceptions from new information. More importantly, low-expectation students may not get as great an opportunity to integrate and vocalize their thoughts.

Finally, the remaining differences, in socioemotional climate, student initiations, and feedback, seem wholly undesirable. Also, beyond evidencing a general pattern of inhibition of slow student participation, their links to performance differences per se are not immediately clear. It is to these links that the remainder of this paper is addressed.

The purpose of the proposed model is to integrate the climate, feedback, and initiation variations into a single process culminating in sustained student performance. Specifically, the model argues (1) that teachers form differential expectations for student performances; (2) that expectations, in conjunction with the interaction context, influence teacher perceptions of control over student performance; (3) that control perceptions influence teacher feedback information and the socioemotional climate of the classroom; (4) that feedback differences influence student beliefs concerning the importance of effort in producing personal outcomes; and (5) that effort-outcome perceptions influence the quality of and motivation behind student performance. An attempt has been made to state the model so that either previous research has generated each proposition or, where more speculation is involved, future research will have a clearly identifiable hypothesis. Figure 1 provides a summary of the model.

*Teachers form differential expectations for student performance.* Variations in student background and ability lead teachers to form differential perceptions of how likely students are to succeed. For instance, and most obviously, high IQ students are assigned a greater likelihood of success at an academic task than average IQ students (Cooper & Lowe, 1977). Higher overall grades are expected of middle- rather than lower-class students (Cooper, Baron, & Lowe, 1975). The fact that performance expectations vary for students is beyond argument (see Braun, 1976; Rist, 1970). The point is made here to ensure that the model begin with the teacher's "raw data" concerning the student, and so that the model's nonrecursive nature be made explicit.

*Expectations and context characteristics influence teacher perceptions of control over student performance.* Not only do teachers form differential perceptions of students,



they also may cognitively distinguish between *classroom interaction contexts*. In particular, classroom contexts (i.e., where an interaction takes place and how it came about) differ in the amount of personal control they afford the teacher. This control can be viewed as having three aspects, or as varying along three dimensions. Control over an exchange can vary in terms of content (what the interaction is about), timing (when it occurs), and duration (how long it lasts). Teachers may be aware that such differences exist and may interpret student performance potentials in relation to situational control implications. It should prove valuable, then, to examine some of these implications for specific classroom settings. The context distinctions offered are taken directly from the Brophy and Good (1970a) Dyadic Interaction system.

A first way in which exchanges differ in classes is concerned with whether the teacher or child was the *interaction initiator*. When a teacher personally initiates a contact, the teacher has chosen and phrased the topic and has picked the student who is to respond. When a student initiates interactions, on the other hand, the child has at least phrased the topic and has determined that he or she will be involved in the teacher's present exchange. Presumably then, the teacher has exercised the greatest control over what an interaction will be about (content) and when an interaction will occur (timing) when the teacher was initiator. Duration control may be greater in teacher initiations also, since interaction content should have contact-length implications.

Turning next to the *setting*, interactions in public must be geared to group needs. In public, the teacher must weigh the needs of any individual against the "group press" created by other class members. Long public interactions are likely to generate disruption from or boredom for some group members. Private interactions, on the other hand, afford teachers more flexibility in determining how long a topic can be pursued. Private interactions typically occur when other students are occupied with individual work. Thus, a teacher's control over the amount of time spent on an interaction should be influenced by the number of students in the setting, with fewer students implying greater personal control.

Considering both initiator and setting distinctions simultaneously leads to a conclusion that the greatest teacher control is felt over self-initiated-private interactions and the least over student-initiated-public interactions. Teacher-public and student-private interactions should fall between these extremes.

Student performance expectations have control implications as well. High expectations imply more control over content because there are more potential topics and perspectives for the teacher to choose from. Duration control also increases as expectations do. High expectations are associated with students who understand topics better and respond appropriately more often. This means that teachers probably perceive more points in contacts with highs where it is legitimate to terminate the discussion. (This, by the way, can be used to explain persistence differences: Teachers think they can pursue an answer further with highs because an appropriate stopping point is likely to appear sooner than with lows.) Timing control differences between highs and lows are more difficult to predict. Low-expectation students create more behavioral problems, but we have already seen that highs initiate more academic contacts.

Studies by Cooper, Burger, and Seymour (1979) have substantiated much of this analysis. First, these authors asked 78 professional teachers to separately rate "how

much control you feel you have over” interaction content and timing in five classroom situations. Control was rated on 6-point scales, ranging from “no control at all” to “total control.” Each situation was rated by the teachers once for their three brightest students and once for their three students who were lowest in ability. Teachers in this first study varied considerably with regard to years of experience and grade level taught. Table I presents a condensed version of the data. As the means in Table I indicate, Cooper et al. (1979) found that teachers perceived greater control over highs than lows, and over public than private exchanges. Initiator also influenced control, but only for highs. These differences were general over all teacher backgrounds.

Cooper et al. then repeated this study, but this time all three types of control (content, timing, and duration) were measured. Thirty-four fourth-grade mathematics teachers were subjects. Results nearly identical to the first study were found. However, this time the predicted less-control-in-student-initiations main effect was also evidenced. It seems, then, that teachers report the least control over public interactions with low-expectation students. This is especially true when the slow student initiates the exchange.

The importance of teacher control in the expectation-communication process becomes clearer when control and likely success perceptions are related. Specifically, it is suggested that high-expectation students “carry around” with them a high likelihood of success, regardless of teacher interaction control. Low student success, on the other hand, may be seen as more dependent on the material involved, on the amount of time available, and/or on whether the teacher is prepared to expend the energy demanded by the interaction. This contention is supported by findings in the achievement attribution literature which indicate that low-ability success is relatively more often attributed to environmental factors (see Cooper & Lowe, 1977). Therefore, the interaction context, with its control implications, is probably seen as an important contributor to whether or not low-expectation interactions end in success. The more

TABLE I  
*Teacher Perceptions of Personal Control and Likelihood of Success as a Function of Performance Expectation and Classroom Context*

Classroom Context	Personal Control			Likely Success		
	High Expec- tation	Low Expec- tation	Mean Con- trol	High Expec- tation	Low Expec- tation	Mean Likely Success
Teacher-Public	4.90 (0.42)	4.51 (0.72)	4.71	4.95 (0.92)	3.54 (0.93)	4.27
Student-Public	4.54 (0.76)	4.42 (0.75)	4.48	5.20 (0.67)	4.18 (1.05)	4.69
Teacher-Private	4.90 (0.55)	4.69 (0.67)	4.80	5.25 (0.79)	4.29 (1.11)	4.77
Student-Private	4.72 (0.65)	4.70 (0.67)	4.71	5.21 (1.07)	4.63 (0.93)	4.92
Expectation Mean	4.75	4.58		5.12	4.04	

Note. These data are condensed from data reported by Cooper, Burger, and Seymour (1979). Standard deviations are in parentheses (n = 78).

control a context affords a teacher when interacting with a slow student, the greater the likelihood the teacher can end the interaction positively. When teachers similarly evaluate interactions with high-expectation students, the classroom context should be of less importance.

Cooper et al. (1979) also examined how context affected perceived likely success for highs and lows. Again, Table I presents these data. As can be seen, the low-expectation likelihoods varied considerably across settings while high-expectation likelihoods remained nearly constant. In addition, the low-expectation likelihoods have a rank ordering identical to their personal control counterparts, the high-expectation likelihoods do not. Taken together, these data strongly suggest that teachers perceive their own control as a more important determinant of low- than high-expectation student success. Put differently, teachers see the control implication of a context as most affecting how slow students will perform. The second Cooper et al. study also supports these conclusions.

The particular implication of this reasoning and evidence seems clear: *Slow student initiations, especially in public, have relatively poor teacher control implications and, therefore, low-success likelihoods.* The differing personal control and success implications of contexts, and their differing importance for highs and lows, provide the link between performance expectations and observed patterns of behavior. The above conclusion—that teachers perceive the least control over and the least chance of success for interactions initiated by slow students in public—makes feedback and climate patterns in classrooms understandable.

*Teachers' perceptions of personal control influence classroom climate and choice of feedback contingencies.* We have seen that teacher control over low-expectation student performance varies from context to context, and control is important for positive outcomes. It seems reasonable to conclude, then, that some contexts for lows are more desirable than others. A teacher can influence the content, timing, and duration of low student exchanges, then, by using feedback and climate to inhibit low control interactions and to facilitate high control interactions. Specifically *control can be maximized over low student performance by inhibiting student initiations and, instead, seeking low students out in private settings.* Such a strategy may entail the use of simple reinforcement principles. The teacher can increase personal control through the creation of an unrewarding socioemotional environment and the relatively infrequent use of praise and freer use of criticism in interactions with lows. That these features of the classroom environment exist for low-expectation students has been documented above.

The use of feedback and climate to control interactions has other implications. A control strategy means high- and low-expectation students are evaluated using different contingencies. High- and low-expectation students exhibiting equal effort on a task may not receive identical feedback. Teachers will tend not to praise strong efforts from lows because praise will reduce future personal control by encouraging initiations. Teachers will tend to be more critical of weak efforts from lows since criticism increases control. In evaluating highs, teachers can dispense praise and criticism with greater dependence on exhibited effort, since future control of highs' behavior is not as necessary. Evidence that effort is, in fact, the contingency used in feedback dispensation when control is not an issue comes from studies in attribution theory (see Weiner, 1977, for a review).

The personal control formulation hypothesizes that *as performance expectations decrease, the use of climate and feedback to control future interaction contexts will increase. Greater use of feedback to control future contexts reduces its use based on expended effort*. Put differently, in interactions with low-expectation students, teacher feedback and expressions of general affect depend on the effect the teacher thinks these evaluations will have on the controllability of future interactions. With high-expectation students, because control of future interactions is not as important for success, feedback and affect will be more frequently based on the specific merits of the performance (i.e., the effort level exhibited).

While there is much evidence that the frequency and proportion of praise and criticism experienced by highs and lows often fit the differing contingency hypothesis, the hypothesis itself is unique to the present formulation. As such, no direct evidence for its validity is currently available. Brophy and Good (1974) cited two studies (Rowe, 1974; Willis, 1970), indicating that feedback to highs may be more "appropriate" than feedback to lows, but appropriate is not defined as contingent on effort. Hopefully, the weight of indirect evidence, cited earlier and below, will spur efforts to test the contingency hypothesis directly.

*Feedback and climate influence the rate of student interaction initiation.* To be consistent with the differing contingency hypothesis, evidence should indicate that the frequency of praise and criticism and the emotional climate produced by teachers in class are causally linked to rates of student interaction initiation.

A test of the influence of criticism on initiations was conducted by Cooper (1977). In this study, six teachers were asked to stop criticizing students after an academic interaction. Classrooms were observed before and after criticism removal and student initiation frequencies were compared. It was found that highly criticized students sought out the teacher less often than moderately criticized students before criticism removal. However, after criticism stopped, highly criticized students surpassed moderates in initiations. The effect of criticism removal was a relative increase in initiations by those students who were previously most criticized. In another study, Entwisle and Webster (1972) examined the relation of praise to student initiations. They reported that increasing the amount of praise a teacher dispensed led to an increase in frequency of student hand raising. Both results support the hypothesis that feedback can be used to inhibit low control exchanges.

Turning to the influence of climate, Sarbin and Allen (1968) manipulated reinforcement rates to high and low participators in a seminar setting. Positive reinforcement (close attention, head nodding, expressions of agreement) led low participators to increase contributions. Negative reinforcement (ignoring responses, expressing boredom) led high participators to contribute less.

Other studies linking expectations, feedback, and initiation rates can be found. Good and Brophy (1974) reported that rejection students (students whom teachers would like removed from their class) were criticized more often than classmates after seeking out the teacher. Means, Means, Castleman, and Elsom (1971) found that poor students expecting to do poorly showed the lowest participation rates in class.

It is argued, then, that the climate, feedback, and output factors may all be causally linked. The three factors are systematically integrated if their relation to teacher personal control is taken into account. Negative climate and feedback patterns for low-expectation students decrease these students' initiation rates. Teacher control

over when interactions with slow students occur is thus increased. Greater control over when exchanges occur gives teachers more control over content, timing, and duration and a greater chance of success. While increasing positive experiences for slow students is an admirable end, the concurrent effect of less effort-contingent feedback to slows may have an unwanted detrimental effect.<sup>1</sup>

*Feedback contingencies influence student perception of effort-outcome covariation.* To this point, nothing has been presented which necessarily implies low teacher expectations sustain poor student performance. Using feedback to increase personal control over content, timing, and duration of teacher-student interaction seems an understandable process. Inhibition of student initiation should not have a direct effect on the quality of student performance. The sustaining of low-expectation student performance, then, is not viewed as a result of differing feedback but rather as a result of feedback contingencies. Again, the concept of personal control provides the conceptual bridge.

For achievement motivation (Atkinson, 1964) to be maintained, it is necessary that students believe they personally influence their academic outcomes. One characteristic which distinguishes students who are high in achievement motivation from those who lack this motivation is the highs' belief that effort produces academic outcomes. As evidence of this, Kukla (1972) asked male subjects differing in achievement motivation to play a digit guessing game. Successes and failures at the game were randomly determined but instructions were worded so that any cause was possible. It was found that students who were high in achievement motivation believed that their degree of effort and performance outcome covaried. That is, they believed the harder they tried, the more likely they were to have succeeded. Students low in achievement motivation, on the other hand, perceived less such effort-outcome covariation. No matter how hard they tried, low-achievement-motivated students perceived effort as less able to influence the outcome of their performance. If arguments to this point are correct, such a perception on the part of low-expectation students may be an accurate reflection of their classroom environment. High-expectation students may be criticized when the teacher perceives them as not having tried and may be praised when efforts are strong. Low-expectation students, however, may be praised and criticized more often for reasons independent of their personal efforts, namely the teacher's desire to control interaction contexts. Greater use of feedback by teachers to control interactions may lead to less belief on the part of students that personal effort can bring about success.

Several studies can be cited which either directly or indirectly support the link between feedback contingencies and effort-outcome covariation beliefs in students. Cooper (1977) reported that students who were observed as receiving the greatest amount of criticism in class perceived significantly less effort-outcome covariation than students receiving less criticism. Interestingly, Cooper (1977) also found that interaction initiation and effort-outcome covariation tended to be related; more frequent initiation tended to be associated with greater belief in effort-outcome

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<sup>1</sup> It has been assumed in this discussion that students perceive teacher praise and success as synonymous. This seems highly plausible, and especially so in earlier grades, where Pygmalion effects are believed to be most pronounced.

covariation. In this study, it was assumed that more frequent criticism by teachers implied more use of feedback to control interactions. In a study by Kennelly and Kinley (1975), male student perceptions of feedback contingencies were directly assessed. These researchers found that boys who felt their teachers were contingently critical also showed stronger beliefs that they personally controlled their own rewards. No relationship between contingent praise and personal control beliefs was found, however. This finding may be due to the relatively greater frequency of praise use, in comparison to criticism, making praise a phenomenologically less powerful reinforcer.

Dweck, Davidson, Nelson, and Enna (1978) attempted to uncover some of the antecedent conditions causing girls to believe more often than boys that failures are due to lack of ability rather than lack of motivation. These authors observed classrooms and recorded instances of work-related feedback that was contingent (based on competence or correctness) and noncontingent (based on neatness, following instructions, speaking clearly), and the naturally occurring attributions teachers made about performance. Results indicated that girls (assumed to be weaker believers in effort-outcome covariation) received over twice as much negative feedback directly related to the quality of their performance. Dweck et al. (1978) also reported that, even though boys and girls received equal *amounts* of failure feedback, boys' failure feedback was significantly more often accompanied by attributions to lack of motivation.

*Effort-outcome covariation beliefs influence student performance.* To complete the expectation communication and influence process, the effects of perceived noncontingent reinforcement on personal efforts need to be examined.

That noncontingent reinforcement does lead to performance deterioration is well documented. Most of the research associated with learned helplessness phenomena is relevant here (e.g., Seligman, 1975). Most closely related is a study by Dweck and Reppucci (1973). These experimenters had two females present block design tasks to 40 fifth-grade children. One experimenter always presented designs which could be solved; the other always presented unsolvable ones. When the unsolvable designs became solvable, a number of students continued to be unable to solve them. This occurred even though they had previously solved almost identical problems given by the other presenter. *Children who showed the largest performance decrement were those who least believed that personal factors were involved in their performance outcome.* The belief that ability was the cause of success or failure, rather than effort, was also found more predominant among poorer performers.

In a related effort, McMillan (1977) manipulated the degree of effort required on a task and the feedback received from an instructor in an undergraduate educational psychology course. It was found that "students who exerted high effort and received high praise feedback developed significantly better attitudes toward reading the material and writing the assignment than students who exerted high effort and received no praise" (p. 4,239). Riemer (1975) found that successful subjects given internal attributions (ability, effort) reported more positive affect than successful subjects given external attributions (task difficulty, chance). Lefcourt, Hogg, Struthers, and Holmes (1975) manipulated success and failure at an anagram task. These researchers found that failure had more deleterious effects on performance when subjects believed they were unable to personally alter negative circumstances. In sum, it seems that the effects of feeling little personal control, or specifically little

effort-outcome covariation, may be the result of either (1) negative affect and attitudes towards tasks presented; (2) less persistence in the face of failure; or (3) a greater incidence of failure.

With the translation of feedback contingencies into student perceptions of effort-outcome covariation, and subsequently into student performance, the explanation of the expectation influence process is completed. In a cyclical fashion, student performance differences generated in the above manner can be viewed as sustaining low teacher expectations, since these differences become the teacher's "raw data" concerning students. Poor performance and low expectations continue; teacher control over low-expectation interactions is increased through inhibition of slow student initiations.

In review, the personal control formulation integrates previous findings relating climate, initiation, and feedback differences between high- and low-performance-expectation students. Teacher and student cognitions about personal control and perceived control effects on performance are used as conceptual bridges linking isolated findings. Another difference in teacher-student interaction patterns (i.e., persistence) was also found compatible with the model. The final factor, input (i.e. teachers tend to teach more new and more difficult materials to highs than lows), can also be interpreted within a personal control framework; that is, teacher experience may suggest that presenting new or difficult material to lows requires a large commitment of time. Presenting such material would, therefore, tend to decrease teacher control over the duration of interactions with low-expectation students. As noted earlier, not presenting new material would seem to have direct effects on low-expectation-student performance.

### Some Related Issues

*The teacher's intention.* Two questions related to teacher intentions need to be addressed. The first is whether or not using feedback to control interactions is motivated by a desire for greater personal reward management. The second question is whether or not the process is a conscious one on the part of teachers.

There is evidence indicating that teachers respond to personal rewards in classrooms. Thus, Yarrow, Waxler, and Scott (1971) found that teachers were quicker to initiate a follow-up contact with a student who had been responsive and rewarding in their last exchange. Brandt (Note 6) found that teachers stated they enjoyed working with successful students more than with unsuccessful ones. It seems safe to say, then, that personal reward considerations may be a factor in feedback and climate choices. However, studies often find that teachers initiate more interactions with lows (Evertson et al., Note 4). Therefore, a conclusion that teachers avoid slow students is inappropriate. Rather, teachers may be attempting to control when and where these interactions occur and to manipulate the content involved. Teachers may want to determine the timing of interactions which will demand large personal efforts. They are typically not attempting, through feedback use, to make their environment free of effort or failure.

How conscious may a teacher be of the process when the feedback and climate differences exist? Most often, teachers are probably unaware of systematic differences in feedback contingency choices. It has been argued that teachers basically *react* to students in classrooms rather than *act* on them (Brophy & Good, 1974). Inhibiting



slow student initiation through the use of negative feedback and climate use is probably a spontaneous affective response. It is a reaction to the personal demands and environmental press these students can create. The control feedback contingency is probably systematic because of recurring uncontrollable and overly demanding interactions with lows rather than a consciously motivated effort by the teachers.

*Identifying Pygmalion-prone teachers.* Earlier, the conclusion was drawn from past research that expectation effects seemed to be a function of individual differences among teachers. Regrettably, little research has been conducted into what these individual differences might be. The "personal control" formulation offers several possible means for identifying teachers most susceptible to expectation effects. On an intrapersonal level, teachers with great control needs (perhaps as measured by Machiavellianism [see Christie, 1970]) may be more prone to transmitting expectations. Interpersonally, teachers who perceive low-expectation student performance as least controllable, or more precisely, who perceive low students' initiations as least controllable, would be most likely to communicate low expectations. This condition is a function of both teacher and student characteristics. On a behavioral level, dyads exhibiting the feedback, climate, and initiation patterns for lows would be most detrimental. Regardless of where one focuses to identify the style difference, a control contingency for feedback and climate would be most likely to produce poor achievement motivation in students.

*Generalizing the model.* What has been described is a sequence of relations, most of which have a fair amount of scientific validation behind them. Because relations tie specific events, other causes for each event can be identified. For instance, things other than expectations are likely to influence control perceptions. Teacher personality was mentioned above. A student's ability to vocalize in public would be another. Each new cause may be correlated with expectations, but each may also contribute uniquely to the control perception. This additional causal specification can be undertaken for each event in the chain. In such a manner, the completeness of the explanation for teacher influence on achievement can be extended.

*Needed Research.* The model suggests that future research on performance expectations may profit from certain redirections, especially in methodological emphasis.

First, contextual variables need to be built into research designs. The personal control model proposes that an academic expectation has a differing effect on teacher behavior dependent on the classroom situation. That is, teachers probably treat highs and lows more differently in public than in private, at least with regard to the behaviors in the sequence. In addition, expectations for specific students may differ from situation to situation (i.e., "Johnny has trouble in public, but when I work with him individually he does fine"). Research which incorporates contextual variables (here, initiator and setting differences are used) is likely to produce more valuable information, and reduce error variance over studies which ignore or control situational variation.

Additional cognitive mediators may need to be studied. It is proposed that expectations do not directly influence teacher behavior nor do all teacher behaviors directly influence student achievement. Rather, expectations are viewed as related to other teacher cognitions (here, perceptions of personal control) which seem, at least intuitively, more closely tied to a teacher's choice of how to behave. For students, achievement is viewed as the product of student efficacy beliefs as well as student ability. By measuring student efficacy perceptions (or other relevant self-perceptions)

and viewing them as mediating teacher behavioral influences, research efforts will be likely to produce more accurate reflections of the actual influence process. Explanations will also be viewed as more complete.

The personal control model can predict behavioral patterns which are more specific than most data generated by previous classroom research. For instance, low-expectation students often receive more criticism and less praise than high-expectation students. This often leads to decreased initiation rates. No research, however, has examined the kinds of interactions which follow praise and criticism. The model would predict that an instance of criticism would be more often followed by a teacher initiation while praise would lead to more student initiations. This would seem to hold for both the immediate subsequent interaction and the next exchange with the particular student. Undeniably, classroom interactions are not independent events; any exchange is highly dependent on what has gone before. Closer concentration on behavioral sequences, as opposed to aggregated behavioral frequencies, would undoubtedly produce a wealth of new information. Models which predict behavioral sequences ought to be viewed as more powerful than models dealing solely with total or averaged behavioral occurrences.

Finally, the personal control model rests on the proposition that teacher behavior influences student self-image. It is consistent with the model to expect that teachers more frequently *tell* high than low expectation students that effort is the cause of their success or failure. Beyond the work by Dweck et al. (1978), little research has been conducted concerning the causal explanations teachers verbally transmit to students and which students may then use as self-perception information. While such direct self-image information is only a part of that available to students, sensitive methods for measuring naturally occurring attributions in the classroom ought to be developed.

*The relation of the model to other conceptions of control.* Recently, much theorizing and research has focused on individuals' perceptions concerning their personal ability to manipulate the environment. For example, Bandura (1977) has proposed that self-efficacy beliefs influence whether or not coping behaviors will be initiated, how intense these behaviors will be, and how long they will last. Seligman (1975) argued that a low expectancy of environmental effectiveness is a determinant of depression. Langer and Rodin (1976) reported that inducing increased responsibility beliefs in nursing home patients increased activity and happiness. These are just a few of many conceptually similar efforts (others include deCharms, 1968; Steiner, 1970).

The present effort obviously owes a large debt to this body of work. The expectation communication model rests on the shared belief that the concept of personal control is of substantial importance as an explanation of human behavioral variation. The present theoretical effort, however, differs in focus from those cited above. The previous efforts, to oversimplify, have mostly been concerned with answering the question: "What are the consequences of believing little personal control is available?" This effort, in the main, asks, "What interpersonal and environmental circumstances increase the importance of personal control beliefs as determinants of behavior?" The classroom, with its strong managerial imperatives, is an appealing location in which to begin seeking the answer to this question. It is hoped, however, that theories constructed to apply to relatively circumscribed situations, such as teacher-student relations, will eventually find their way into a more general theoretical superstructure.

## Summary and Conclusions

To summarize, a causal process theory was proposed to explain performance expectation communication and behavioral influence. The steps in the model were as follows:

(1) Variations in student ability and background lead teachers to form differential expectations for student performance.

(2) These expectations, in conjunction with the interaction context, influence teacher perceptions of control over student performance. Interactions initiated by low-expectation students, especially in public, are found least controllable and least likely to succeed.

(3) Teacher perceptions of personal control influence classroom climate and choice of feedback contingencies. Teachers may be increasing personal control by creating a negative climate and feedback pattern for lows, and thus inhibiting low initiations. This means that lows are more often praised and criticized for control purposes (external to student performance) and highs are more often evaluated with effort as the criterion (a personal cause).

(4) Negative climate and feedback patterns may decrease student initiations. The negative patterns employed with low-expectation students then result in increased teacher control over interaction content, timing, and duration.

(5) Feedback contingencies also may influence student effort-outcome covariation beliefs. A stronger belief on the part of lows than highs that reinforcements are controlled by external factors was proposed as a consequence of using a control feedback contingency. It was pointed out that a belief in personal efficacy is a prerequisite for achievement motivation.

(6) Finally, effort-outcome covariation beliefs may influence student performance. Noncontingent reinforcement was seen as causing negative affect and attitudes, less persistence at tasks, and more frequent failure.

The amount of past research concerning expectation communication now seems large enough so that attempts at building sequential models, such as that presented here, may be appropriate. Further, the difficulty in pinning down the nature and size of expectation effects may dictate that the best evidence for their existence lies in a verifiable theory of how expectation effects are communicated. While empirical evidence will undoubtedly lead to modifications, it is hoped that the presented model will stimulate further thought and lead to research with increased direction and specification.

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